

III.—DARWINISM TESTED BY LANGUAGE.

DARWINISM TESTED BY LANGUAGE. By Frederick Bateman, M.D.
London, 1877.

What is a man? "manners make the man," says one; "dress makes the man," says another. Dr. Franklin defined him as a "tool-using animal;" somebody else, as "an animal with a religion." All these and several other distinctive characteristics have been shown to be insufficient or erroneous, and now Dr. Bateman, whom we know well as the author of an excellent monograph on aphasia, argues for the existence of another essential point of difference in the fact, as he declares, that the former possesses the power of using articulate language while the latter has no such faculty. By this test Dr. Bateman proposes to try the Darwinian hypothesis of the descent of man, and he asserts that here is the difference, not in degree but in kind, which Darwin demanded should be furnished before he would consent to renounce his views.

Before proceeding to the discussion of the many interesting points adduced by Dr. Bateman in support of his opinion, it may be well to inquire whether, if the animals lower in the scale than man did speak, they would be any the more men, and if man were to be rendered incapable of thus expressing himself, he would be any the less a member of the genus *Homo* than he is now. It may seem absurd to raise such a question, but yet it is very evident that if Dr. Bateman be correct in the inferences he has drawn, it is one which rather forcibly stares us in the face.

We have been looking for some radical difference between man and the brute. Dr. Darwin and his followers say there is no such difference. Dr. Bateman, on the contrary, tells us there is an essential one in articulate language. Every animal, therefore, that possesses the faculty of communicating ideas or expressing emotions by words is a man; every animal that is not thus endowed is not a man.

The point is by no means a new one. Locke had it very clearly in his mind when he said, "I think I may be confident that whoever should see a creature of his own shape or make, though it had no more reason all his life than a cat or a parrot, would call him still a man; or whoever should hear a cat or a parrot discourse, reason and philosophize, would call or think it nothing but a cat or a parrot; and say, the one was a dull, irrational man and the other a very intelligent, rational parrot; and then he goes on to relate a story on the authority of Prince Maurice, which, whether true or not, serves equally well for an illustration:

"When it came first into the room where the Prince was with a great many Dutchmen about him, it said presently, 'What a

company of white men are here!' They asked it what it thought that man was, pointing to the Prince. It answered 'Some General or other.' When they brought it close to him he asked it, 'D'où venez vous?' It answered, 'De Marinnan.' The Prince, 'A qui estes vous?' The parrot, 'A un Portugais.' The Prince, 'Que fais-tu là?' 'Je garde les poulettes.' The Prince laughed and said, 'Vous gardez les poulettes?' The parrot answered, 'Oui moi et je scai bien faire,' and made the chuck four or five times that people use to make to chickens when they call them."

"And," continues Locke, "I ask any one else who thinks such a story fit to be told whether,—if this parrot and all of its kind had always talked, as we have a Prince's word for it this one did,—whether I say, they would not have passed for a race of rational animals; but yet, whether, for all that, they would have been allowed to be men and not parrots? For I presume it is not the idea of a thinking or rational being alone that makes the idea of a man in most people's sense, but of a body so and so shaped, joined to it."*

This latter appears to us to be exactly the point. It is not so much the mental faculties, or the intellectual characteristics that constitute the chief features of difference between man and the other animals, as it is the structure of the body and the degree of development of the several organs by which both mental and physical acts are performed; and we say this with a full conception of the immense distance there is between the mind of the lowest man and that of the highest monkey. But in the one case the difference relates solely to mentality, while in the other it concerns the organs from which the mentality comes, and those others through which it must act. Mind in the abstract, that is, without considering it in its necessary connection with a nervous system as an effect with its cause, is something of which we can form no distinct idea. We can only regard it as the product of nervous action, and hence, however much we might be astounded by its manifestations, it is in reality insignificant in comparison with the little cells which, by their aggregation, go to make up the structure of gray nerve-tissue, and by which it is evolved. The source of a spring is more important than the spring itself; a galvanic battery is to the thoughtful person a greater subject for astonishment than the force which it sets in action; the brain of a Newton is far more wonderful than the mighty intellect—a part only of its force—which comes from it.

And this is not all, for even if the lower animals were endowed with brains as large and as complex in structure as that of man, they would still in the inadaptability of their organs for the purposes for which man uses his, be immeasurably his inferiors. No quantity or quality of brain would enable a horse to write a letter, or to get rid of an offensive substance in his stomach by vomiting; though a dog were as wise as Socrates he could not

* An Essay concerning Human Understanding, Chap. XXVII., §8.

play a tune on the violin, and though an ape might possess the majestic cerebral development of a Cuvier his hand would be none the more adapted to the performance of that infinite variety of delicate manipulations which marks the action of this organ in man. These, to be sure, are only differences of degree, and though by successive development in the course of ages they would probably disappear, they nevertheless at present exist.

Again, there are men, undoubted men, who in their manners, customs and modes of life are more akin to the brute than to the genus in which, by a consideration of their structure and appearance, we are forced to place them. Thus Sir John Lubbock quotes Dalton as asserting* that there are wild men living in the interior of Borneo, absolutely in a state of nature, who neither cultivate the ground nor live in huts; who neither eat rice nor salt, and who do not associate with each other, but rove about the woods like wild beasts: the sexes meet in the jungle, or the man carries away a woman from some company. When the children are old enough to shift for themselves, they usually separate, neither one afterwards thinking of the other. At night they sleep under some large tree, the branches of which hang low; on these they fasten the children in a kind of swing; around the tree they make a fire to keep off the wild beasts and snakes. They cover themselves with a piece of bark, and in this, also, they wrap their children; it is soft and warm, but will not keep out the rain. The poor creatures are looked on and treated by the other Dyaks as wild beasts.

Piron,† in describing the natives of Van Diemen's Land, speaks of them as being without laws or any system of regular government, without arts, even being destitute of all knowledge of agriculture or of working in metals, and not even having subjected any of the lower animals to their service. They wear no clothes, have no definite habitations, and no shelter from the weather beyond a rude shed which they make of bark.

Darwin‡ regards the Fuegians as the most miserable creatures he has ever beheld. "These Fuegians," he says, "in the canoe were quite naked, and even one full grown woman was absolutely so. It was raining heavily, and the fresh water, together with the spray, trickled down her body. In another harbor, not far distant, a woman who was suckling a recently born child, came one day alongside the vessel and remained there out of mere curiosity, while the sleet fell and thawed on her naked bosom, and on the skin of her naked baby! These poor wretches were stunted in their growth; their hideous faces bedaubed with white paint, their skin filthy and greasy, their hair entangled, their voices discordant, and their gestures violent; viewing such men, one can hardly make oneself believe that they are fellow-cre-

*Origin of Civilization and the Primitive Condition of Man. Second edition. London, 1870; p. 8.

† Voyage de decouvertes aux Terres Australes, t. i., chap. 20.

‡ Journal of Researches, etc. New York, 1871, p. 218.

tures and inhabitants of the same world. It is a common subject of conjecture what pleasure in life some of the lower animals can enjoy; how much more reasonably the same question may be asked with respect to these barbarians! At night five or six human beings, naked and scarcely protected from the wind and rain of this tempestuous climate, sleep on the wet ground coiled up like animals. Whenever it is low water, winter or summer, night or day, they must rise to pick shell-fish from the rocks; and the women either dive or collect sea eggs, or sit patiently in their canoes, and with a baited hair-line without any hook, jerk out little fish. If a seal is killed, or the floating carcass of a putrid whale discovered, it is a feast; and such miserable food is assisted by a few tasteless berries and fungi."

To call such creatures men is a degradation of the term, it must be confessed, and yet in structure they resemble more closely an average civilized Caucasian than they do the most perfectly developed of the anthropomorphous apes—no one studying them thoroughly, or glancing at them cursorily, would for an instant doubt their position among animals. But it is by no means certain that in mental development there is as much difference as there is in physical characteristics. Indeed, in some respects, they are lower than the brutes above which we place them. They are remorselessly cruel; their women and children are treated with a degree of barbarity of which the monkey is incapable; the affections are undeveloped, in fact there is scarcely a trace of any generous or ennobling quality in their degraded natures. They are ignorant of all sense of justice, or of right or wrong; they are entirely destitute of religious feelings, and have no conception of being superior or very different from the beasts by which they are surrounded. They can talk, but their language consists of guttural monosyllables scarcely more articulate than the cluckings of a hen, and some of them have no abstract terms, no idea of time, no names for each other, and no words for numbers exceeding three. Indeed, so far as language goes, there are greater differences between them and civilized man than there is between them and the gorilla.

We are hence led to conclude that Dr. Bateman's distinction is not of the importance which he has given it. But his book is too earnest, and written in too scientific a spirit to be dismissed thus abruptly. He has presented all the facts in the case, as he understands them, with singular fairness, and he deserves equally earnest and honest treatment. Unless he gets this, unless his position is met and logically combated, his essay is very certain to be seized upon by the unphysiological, sciolistic and conspicuously inexact anti-evolutionist, and held up to the admiring gaze of his adherents as presenting arguments which the heterodox Darwinian cannot answer. We propose, therefore, to show by an appeal to anatomy and physiology that his assumed test is not one by which the doctrine of evolution is to be overthrown.

But before proceeding to the discussion of Dr. Bateman's

observations and arguments, it will probably not be out of place if we give a brief account of what has been done in recent years towards the localization of the faculty of speech in a particular part of the brain; and this is the more important because, as we shall see, the point in regard to the value of language as a test of the essential difference between man and other animals rests, in a great measure, on this matter of localization. If, in fact, it can be shown that there is a part of the brain whose function it is to preside over the faculty of articulate speech, and that this part exists in apes as well as in man, we have, as Dr. Bateman repeatedly admits, a strong argument for the hypothesis of evolution. Develop the organ in the latter and they will speak, or to use Dr. Bateman's exact language, "It might be said that the ape possesses the rudiments of speech in an undeveloped form, and that in subsequent generations by the process of evolution this fold [the third frontal convolution, though of course, the argument is equally good for any other locality], would become more developed and the ape would speak; in fact would become a man!" As to a talking ape being necessarily a man, we have already expressed our doubts, but as we shall have occasion to return to this point, we pass it by for the present.

Previous to Gall, there had been no attempt to define with precision the seat of the faculty of speech, or even to prove that there was such a faculty. But in the early part of the nineteenth century this able cerebrologist not only declared that there was a region of the brain specially devoted to language, but that it was that part of the anterior lobe on each side which rests upon the roof of the orbit. A large development of the brain, in this locality, would of course be attended with a depression of the bony plate upon which it rests; the cavity of the orbit would therefore be diminished in capacity and the eye would be rendered prominent. He therefore announced that the existence of a special ability for memorizing words, and for studying and using language, was marked by prominence of the eyeballs.

In reality Gall considered that there were two organs of language, the one originating the idea of words, the other a talent for philology and for acquiring the spirit of language. Dr. Spurzheim however admits but one organ, lying posteriorly on the supra-orbital plate, and this view is accepted by Combe and other distinguished phrenological authorities. Several cases were brought forward in support of this theory of localization, but none of them were of a very decided character, and hence Gall's views met with very slight favor outside of the class of his immediate followers.

As we have seen, Gall placed the organ of language in a limited part of the anterior lobe of each hemisphere. This was the first attempt at localization. But shortly afterward Bouillaud, who had collected a large number of cases of injuries and diseases of the brain, announced that in very many of these cases in which the anterior lobes were the seat of the lesion, there was

the concomitant of derangement of the faculty of speech, and he also confirmed what had been noticed by others, that absolute loss of the power of speech may exist without there being any noticeable impairment of mind or derangement of body. He likewise clearly pointed out the fact, that the faculty of speech embraces two distinct series of phenomena, the one relating to the power of creating words as representations of ideas and of recollecting them; the other to the co-ordination of the movements necessary for the articulation of these words. The first of these he called internal, the second external speech.

Bouillaud supported his views by the citation of numerous cases—in all, one hundred and three—of lesion of one or other of the anterior lobes in which there was also some derangement of the faculty of speech, and he finally offered a prize of five hundred francs to any one who would adduce a case of profound injury or disease to this region of the brain in which there was not also some trouble of articulation. The prize was claimed by Velpeau, who called attention to the fact that he had in 1843, described the case and exhibited the brain of a wig maker, who, up to the moment of his death, was in full possession of his mental faculties, and who was remarkable for his loquacity, but in whom both anterior lobes were entirely destroyed by a tumor. Inquiry however showed that a very considerable portion of each lobe was intact.

Nevertheless a sufficient number of instances are on record which establish the fact in the most indubitable manner, that Bouillaud was too general in his localization, and that the anterior lobes may suffer the most frightful injuries without the faculty of speech being notably impaired. Among these is the case related by Dr. Harlow, of Vermont, in which a tamping iron was by the premature discharge of a blast driven through a man's skull. Notwithstanding the severity of the injury the man resumed his consciousness in a few minutes, was put into a cart, driven three-quarters of a mile, when he got out and walked into his house. He lived for twelve and a half years afterwards, and then died, after having had several convulsions. His cranium is now in the Warren Anatomical Museum, at Boston, and an examination of it shows that the iron entering the base of the skull on the left side had gone entirely through the left anterior lobe of the brain and made its exit at the top of the head. The only aberration of speech noticed in this individual, was his having become exceedingly profane in conversation. If the faculty of language resides in the whole of the anterior lobe, as Bouillaud contends, such an immunity could scarcely have existed. There can be no doubt, therefore, from a consideration of this, and many other cases, that Bouillaud was wrong in claiming that injury of any part of the anterior lobes is necessarily followed by some derangement of the faculty of speech. Subsequently, however, he admitted that the organ of language may occupy the posterior part of each lobe only.

In 1836, Dr. M. Dax read a paper before the Medical Congress which met that year at Montpellier, in which he asserted that the faculty of language was seated, not as Gall and Bonillaud had concluded, in both anterior lobes, but that it occupied only the left anterior lobe. He based this opinion upon one hundred and forty cases of aphasia* attended with paralysis, in which the want of power was confined to the right side of the body ; showing therefore that the lesion causing it and the aberration of speech was situated on the left side of the brain. This paper never attracted much attention, notwithstanding its importance, a circumstance very often the result of burying scientific communications in the archives of insignificant societies.

Thus far we see the organ of language placed in the left anterior lobe. It must be confessed, however, that this location was by no means accepted by even a considerable body of anatomists and physiologists, while the great majority either opposed the localization theory, or regarded it with contempt, as a phrenological vagary.

But, in 1861, M. Gratiolet, in discussing before the Anthropological Society of Paris, a question relative to the comparative development of the brain and mind among different races, brought up the subject of cerebral localization to which he announced himself as being strongly opposed. M. Aubertin, on the contrary, contended that the localization of the faculty of speech, at least, was definitely established through the researches of Bouillaud in the anterior lobes. In support of this view, he adduced cases which had already been brought forward, and cited others in addition, which went to show that loss of speech was the consequence of traumatic lesion of these parts of the brain. His adversaries cited other cases in which persons had preserved the faculty of language, notwithstanding extensive injuries of the anterior lobes. M. Aubertin responded, that if such profound and extensive lesions had not interfered with speech, it was because that part of the lobes in which the organ is situated was not involved, and he then cited the case of a patient in the Hospital for Incurables, who, for many years, had been deprived of the power of speech, and he declared that he would renounce the doctrine of Bouillaud if the autopsy of this patient did not reveal the existence of disease of the anterior lobes. The patient in question was under the charge of M. Broca, and the latter, a decided opponent, accepted M. Aubertin's challenge, and declared that when the man died the examination should be made. Sometime afterward the patient died, the *post-mortem* examination was made, and the lesion was found to occupy the left anterior lobe.

And now the contest waxed warmer ; M. Broca, who had been a most determined opponent of Bouillaud's views of localization,

* *A*, privation, and *aphasia*, speech. Aphasia may be defined as a condition produced by an affection of the brain, in which the idea of language or of its expression is impaired.

became converted. Taking as his principal case the one to which M. Aubertin had pinned his faith, he read, in 1861, before the Anatomical Society, of Paris, a memoir,* in which he not only contended for the restriction of the organ of speech to the left anterior lobe, but carried the differentiation still further by assigning it to a limited part of this lobe, the posterior part of the third frontal convolution. Cases were now brought forward in all parts of the civilized world—our own country contributing some of the most important—going to establish the truth of Broca's views, and the literature of the subject increased enormously.

But, although many instances were adduced going to show that lesion of the third left frontal convolution caused derangement of the faculty of speech, several cases of undoubted aphasia were cited, in which during life the accompanying paralysis had been on the left side of the body, or, in which, on *post-mortem* examination, the third left frontal convolution was found to be perfectly healthy. Again there were cases in which this portion of the brain was found to be entirely disorganized, but yet, in which there was no resultant aphasia; one such case—and there are quite a large number—is, of course, sufficient to decide the question against Broca's doctrine, and, therefore, notwithstanding the very striking evidence which may be adduced in its favor, facts show beyond a doubt that he assigned to the organ of language a too restricted habitation. But with all that has been said against Broca's hypothesis, we are not, on that account, unwarranted in assigning a certain definite locality to the organ of language. On the contrary, the discussion of the subject, and the vast array of cases brought forward, enable us to fix the position of that organ with as much certainty as is necessary for the establishment of the relation of cause and effect. Dr. Bateman, therefore, in attacking the doctrine of the third frontal convolution, and arguing that because Broca's views are shown to be untenable, we are without data for speech localization in the brain, is contending against a theory which it may be said no one—probably not even Broca himself—now entertains. If we can show that there is any locality in the brain with which the function of speech stands in direct relation, and if we further show that this portion of the cerebrum exists in the ape, though undeveloped, we do a great deal, as Dr. Bateman admits, towards explaining why this animal, which stands in the zoological scale so close to man does not, like him, express his ideas and emotions by articulate language.

The anterior lobe of each hemisphere of the brain is separated from the middle lobe by a fissure called the fissure of Sylvius. In it is situated the middle cerebral artery which supplies blood to the posterior part of the anterior lobe, the anterior part of the

*Sur le siège de la faculté de langage articulé, etc. *Bulletin de la Société Anatomique*, Tome IV., 1861.

middle lobe, and to the lobe of the insula—a small mass of brain tissue placed in the fissure and sometimes called, after its discoverer, the island of Reil. This latter is found in no other animal than in man and the monkey. In the latter, however, it is very slightly developed, and has been said by Huxley and others to present no trace of convolutions. Now there is not a single well authenticated case of injury or disease involving all this region nourished by the middle cerebral artery on both sides in which there was not derangement of the faculty of speech, and there is not a single case of aphasia on record in which if any lesion at all was found in the brain, that lesion was not situated in some part of this region on one or other side of the brain. It is true, there are cases of aphasia occasionally met with in which minute examination after death, fails to reveal the existence of any lesion at all, but we may very properly disregard these, for the like fact exists frequently with other cases of undoubted cerebral disease. In such instances the disorder—probably some derangement of circulation acting instantaneously and for a short time—disappears with the cessation of life.

This region may, after Kussmaul,* be called the "speech tract." The third frontal convolution, the island of Reil, the corpus striatum and the anterior part of the middle lobe, all of which have been shown to be intimately connected with the faculty of articulate language, are parts of this "speech tract."

We are now prepared to consider Dr. Bateman's arguments in favor of the view that articulate speech is a distinctive quality of man, and to meet his objections to the localization of the faculty of language in any part of the brain.

W. A. H.

(TO BE CONTINUED.)

IV.—LUDWIG'S ARBEITEN.

ARBEITEN AUS DER PHYSIOLOGISCHEN ANSTALT ZU LEIPZIG. Elfter Jahrgang, 1876. Mitgetheilt durch C. Ludwig. Leipzig: S. Hirzel, 1877. (*Report of the Physiological Institute at Leipzig. Edited by C. Ludwig.*)

Like all its predecessors, the present report of the work done in Ludwig's laboratory is a model of scientific accuracy. Every point investigated therein, however modest its title, and however unimportant its bearings may seem, is a permanent acquisition to physiology.

In the first article, Mr. Ch. S. Minot describes the method of passing a current of defibrinated blood through the vessels of a freshly excised muscle (biceps and semi-tendinosus of the dog). The vessels were first washed out with serum; hereupon a current of arterialized blood was passed through them. The irritability of the muscle could thus be maintained for several hours.

**Stoerungen der Sprache*, Leipzig, 1877.